Petr Stepanov

> Ph.D. graduate in physics with expertise **materials science**, **gamma spectroscopy**, **defect studies**, microscopy, and nuclear physics. 5+ years of experience in **data analysis** and **particle simulations** and software development.

`Materials science. Data analysis. Desktop and web applications development. UI/UX design.`

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Summary of Qualifications

Ph.D. graduate with expertise in gamma spectroscopy, positron annihilation spectroscopy, microscopy, and nuclear physics. Strong background in computational techniques: data anayysis, particle simulations, software development (desktop and web applications). More than 5 years in UI and UX design.

Graduated from BGSU in May 2020. Seeking to become an effective member of a research group in the industry. Authorized to work in the US on Optional Practical Training (OPT) in physics, chemistry, and computer science. OPT expires in February 2023. Will consider visa sponsorship offers.

Work Experience

Research Collaborator (On-Site)
Thomas Jefferson National Laboratory (JLab), Newport News, VA, USA. **Jul 2020 - Current**

Postdoctoral Researcher (Remote)
Catholic University of America (CUA), Washington, DC, USA. **Jul 2020 - Current**

Research Assistant
Bowling Green State University (BGSU), Bowling Green, OH, USA. **Aug 2014 - May 2020**

Frontend Developer, UI/UX Designer • Freelance **Sep 2012 - Current**

Full Stack Web Developer, Web Designer
Gridnine Systems, Moscow, Russia. **Apr 2011 - Aug 2014**

Computer Science Teacher
Phys-Tech College at MIPT, Moscow, Russia. **Oct 2009 - May 2011**

- Provided instructions and guidance to high school students on following computer courses: C/C++ programming, HTML, Adobe Photoshop and 3D Studio Max.

Research Scientist
Institute for Theoretical and Experimental Physics (ITEP), Moscow, Russia. **Sep 2008 - Apr 2011**

- Application of positron lifetime spectroscopy for studying the radioactive-induced defects in steels. Monte-Carlo particle simulations with Fortran 95. Maintaining software for CAMECA tomographic atom probe (MSVC). Application of CERN ROOT libraries for fitting and analysis of experimental spectra.

Education

Bowling Green State University (BGSU) • Ohio, USA **Aug 2014 - May 2020**
Ph.D. in Photochemical Sciences • GPA 3.423. Novel developments in positron annihilation spectroscopy techniques—from experimental setups to advanced processing software. View manuscript.

- Assembled and utilized two spectrometers: positron lifetime and Doppler. Spectrometers are built from ORTEC and Canberra (Mirion) fast electronic units and utilize High-Purity Germanium Detectors (HPGe) and scintillation-based detector systems.

- Developed open-source software (C++, CERN ROOT) for novel interpretation of the experimental spectra.
- Defined and resolved kinetic equations of reactions of positron and positronium atoms (Ps) in solids and liquids and nano-powders (Wolfram Mathemetica). Equation parameters are implemented in the fitting model of experimental spectra (RooFit).
- Above research allowed for estimation of defect concentrations and sizes in solids, classification of defect types (vacancies, dislocations) and more...

Ohio Supercomputer Workshop • Ohio, USA **Jan 2017 - Feb 2017**

Hands-on sessions in Supercomputer Essentials. Introduction to the key developments in the supercomputer field.

- RedHat and CentOS operating systems: environment, networking and SSH.
- Supercomputer job control with BASH and SLURM scripts.
- CMake compiling platform, use of parallel nodes, A.I. fundamentals and more..."

National Research Nuclear University (MEPhI) • Moscow, Russia **Aug 2014 - May 2020**

B.S. and M.S. in Solid State Physics. Defect studies of neutron-irradiated nuclear power plant vessel steels by means of positron annihilation spectroscopy.

Featured Publications

- J. Ji, A. M. Colosimo et. al. ZnO Luminescence and scintillation studied via photoexcitation, X-ray excitation and gamma-induced positron spectroscopy. *Scientific Reports* **2016**, 6 (1). 10.1038/srep31238.
- Le Zhang, Jiadong Wu et. al. Defects and solarization in YAG transparent ceramics. *Photonics Research* **2019**, 7 (5), 549. 10.1364/prj.7.000549.
- P Saadatkia, P Stepanov et. al. Photoconductivity of bulk $SrTiO_3$single crystals at room temperature. *Materials Research Express* **2018**, 5 (1), 016202. 10.1088/2053-1591/aaa094.
- P.S. Stepanov, S.V. Stepanov et. al. Developing New Routine for Processing Two-Dimensional Coincidence Doppler Energy Spectra and Evaluation of Electron Subsystem Properties in Metals. *Acta Physica Polonica A* **2017**, 132 (5), 1628-1633. 10.12693/aphyspola.132.1628.
- P. S. Stepanov, F. A. Selim et. al. A model for joint processing of LT and CDB spectra of dielectric nano-sized powders. *AIP Conference Proceedings 2182* **2019**. 10.1063/1.5135836.

Full list of Petr Stepanov's publication can be found on Google Scholar page.

Computer Science Skills

- **Essentials**. Git, SVN, SSH, Linux, and Terminal usage. BASH scripting. IDEs: Eclipse, Xcode, Visual Studio Code (VS Code). Project management: JIRA, Trello.
- **Simulation and data analysis**: Geant4, CERN ROOT, MATLAB, Wolfram Mathematica, Maple.
- **Academic writing**: LaTeX, MS Office Suite, Zotero.
- **Data plotting**: Gnuplot, OriginLab, QtiPlot, SciDaVis, Grapher.
- **Desktop app development**. C/C++, GNU make, CMake. Frameworks: Qt, CERN ROOT, Geant4. Java and Swing. Python.
- **Frontend**: HTML, CSS (LESS and SASS), Bootstrap, responsive web design, JavaScript and jQuery, npm, gulp, AngularJS, React.js. Google Web Toolkit. PHP and WordPress themes development.
- **Backend**. Node.js, EJS, Java.
- **UI/UX design**. Figma, Sketch, InVision Studio, Adobe XD, Adobe Photoshop, Adobe Illustrator, Inkscape, Blasamiq, Blender.
- **Apple iOS**. Fundamental Swift skills. User interface development with UIkit and storyboards.

Material Research Skills

- **Characterization facilities**. Positron Lifetime and Doppler Broadening Annihilation Spectroscopy (PALS, DBAR). Atom Probe Tomography (ATP). Scanning Electron Microscopy (SEM). Transmission electron

microscopy (TEM). Atomic Force Microscopy (AFM). UV-VIS Spectroscopy. Fourier Transform Infrared Spectroscopy (FTIR).

- **Material processing**. High-temperature annealing. Wet chemical etching. Electrical Contact Fabrication. Sample polishing.

Conferences

18th International Conference on Positron Annihilation (ICPA-18) **Aug 2018**

Orlando, FL, USA

Oral talk "Positions and Ps in Al_2O_3 Nanopowders

International Workshop on Physics with Positrons (JPos17) **Sept 2017**

JLab, Newport News, VA, USA

Poster "A routine of background subtraction from two-dimensional Doppler broadened spectra"

12th International Workshop on Positron and Positronium Chemistry (PPC12) **Sept 2017**

Maria Curie-Sklodowska University, Lublin, Poland

Poster "Developing new routine for processing two-dimensional coincidence Doppler energy spectra"

Ohio Photochemical Society Meeting (Oops) **May 2017**

Maumee Bay Lodge & Conference Center, Maumee, OH, USA

Poster "Developing new routine for background subtraction in two-dimensional coincidence Doppler broadening spectroscopy"

58th Electronic Materials Conference (EMC) **Jun 2016**

University of Delaware, Newark, DE, USA

Oral talk "High-Sensitivity Measurements of Defects in ZnO by Means of Digital Coincidence Doppler Broadening of Positron Annihilation Spectroscopy"

Annual Spring Meeting of the APS Ohio-Region **Apr 2016**

University of Dayton, Dayton, OH, USA

Oral talk "Identification of chemical environment of defects in ZnO by means of digital coincidence Doppler broadening of positron annihilation radiation"

Ohio Inorganic Weekend **Nov 2015**

Bowling Green State University, OH, USA

Poster "Approaching Structural Defect Characterization and their Chemical Identification by Means of Coincidence Doppler Broadening of Annihilation Radiation"

41st Polish Seminar on Positron Annihilation (PSPA-13) **Sep 2013**

Maria Curie-Sklodowska University, Lublin, Poland

Oral talk "Application of positron spectroscopy for detection of nanostructures in alcohol—aqueous mixtures"

Professional Networks